DOCKET: CU-4189

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: James Bruce Franklin et al.

TITLE: A Light Collector

THE COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDED CLAIMS

1-23. (cancelled)

24. (new) A light collector having a dye molecule concentration C, the dye molecules being dispersed in a light transmissive medium, the concentration C being selected to reduce attenuation that light will suffer due to reabsorption or scattering in the main emission wavelength range of the dye molecules so that the combined emission and absorption efficiency of the light collector is increased.

25. (new) The light collector as claimed in claim 24 having a thickness t and wherein the concentration C is selected so that the product of C and t is between 320 and 200 ppm*mm.

26. (new) The light collector as claimed in claim 24 having a thickness t and wherein the concentration C is selected so that the product of C and t is between 200 and 160 ppm*mm.

27. (new) The light collector as claimed in claim 24 having a thickness t and wherein the concentration C is selected so that the product of C and t is between 160 and 120 ppm*mm.

28. (new) The light collector as claimed in claim 24 having a thickness t and wherein the concentration C is selected so that the product of C and t is between 120 and 80 ppm*mm.

29. (new) The light collector as claimed in claim 24 having a thickness t and wherein the concentration C is selected so that the product of C and t is between 80 and 40 ppm*mm.

30. (new) The light collector as claimed in claim 24 having a thickness t and wherein the concentration C is selected so that the product of C and t is between 40 and 20 ppm*mm.

31. (new) The light collector as claimed in claim 24 having a thickness t and wherein the concentration C is selected so that the product of C and t is less than 20 ppm*mm.

32. (new) The light collector as claimed in claim 24 having a dye concentration that is selected such that the combined emission and absorption efficiency of the light collector is optimized.

33. (new) The light collector as claimed in claim 24 wherein the dye molecules are distributed such that at least a majority of the dye molecules are not directly bonded to one another.

34. (new) The light collector as claimed in claim 24 wherein the dye molecules are substantially uniformly distributed throughout the light collector.

35. (new) A light collector having a dye molecule concentration C and a corresponding output of fluorescence light L_{out}, the dye molecules being dispersed in a light transmissive medium and the concentration C being lower than 500 ppm, the concentration C being smaller than a concentration C' and the output of fluorescence light L_{out} being larger than the output the light collector would have if the concentration is C'.

36. (new) The light collector as claimed in claim 35 having a thickness t and wherein the concentration C is selected so that the product of C and t is between 320 and 200 ppm*mm.

37. (new) The light collector as claimed in claim 35 having a thickness t and wherein the concentration C is selected so that the product of C and t is between 200 and 160 ppm*mm.

38. (new) The light collector as claimed in claim 35 having a thickness t and wherein the concentration C is selected so that the product of C and t is between 160 and 120 ppm*mm.

39. (new) The light collector as claimed in claim 35 having a thickness t and wherein the concentration C is selected so that the product of C and t is between 120 and 80 ppm*mm.

40. (new) The light collector as claimed in claim 35 having a thickness t and wherein the concentration C is selected so that the product of C and t is between 80 and 40 ppm*mm.

41. (new) The light collector as claimed in claim 35 having a thickness t and wherein the concentration C is selected so that the product of C and t is between 40 and 20 ppm*mm.

42. (new) The light collector as claimed in claim 35 having a thickness t and wherein the concentration C is selected so that the product of C and t is less than 20 ppm*mm.

43. (new) The light collector as claimed in claim 35 having a dye concentration that is selected such that the combined emission and absorption efficiency of the light collector is optimized.

44. (new) The light collector as claimed in claim 35 wherein the dye molecules are distributed such that at least a majority of the dye molecules are not directly bonded to one another.

45. (new) The light collector as claimed in claim 35 wherein the dye molecules are substantially uniformly distributed throughout the light collector.

46. (new) A method of fabricating a light collector being doped with dye molecules that, in use, absorb light having a wavelength within an absorption wavelength range and emit light having a wavelength within an emission wavelength range, the method comprising

calculating a concentration of the dye molecules taking into account the attenuation that emitted light will suffer owing to re-absorption or scattering in the main emission wavelength range and thereby taking into account that the fluorescence light output L_{out} is reduced for dye concentrations above an optimum value.

47. (new) The method as claimed in claim 46 comprising the additional step of selecting the dimensions of the light collector and calculating the dye concentration for the selected dimensions.

48. (new) The method as claimed in claim 46 wherein the step of calculating the dye concentration takes into account reflection properties of a medium that will be positioned adjacent to the light collector.

49. (new) The method as claimed in claim 46 wherein the wavelength range in which attenuation is taken into account that extends beyond the main emission wavelength range.

50. (new) The method as claimed in claim 46 wherein the wavelength range for which attenuation that is taken into account that extends to a wavelength of at least 50 nm longer than the wavelength that corresponds to maximum emission intensity.

51. (new) The method as claimed in claim 46 wherein the wavelength range in which attenuation is taken into account extends from 380 to 480 nm.

52. (new) The method as claimed in claim 46 wherein the wavelength range in which attenuation is taken into account extends from 400 to 580 nm.

53. (new) The method as claimed in claim 46 wherein the wavelength range in which attenuation is taken into account extends from 460 to 700 nm.

54. (new) The method as claimed in claim 46 wherein the wavelength range in which attenuation is taken into account extends from 530 to 700 nm.

55. (new) The method as claimed in claim 46 wherein the step of calculating the dye concentration is conducted such that a dye concentration for optimum combined absorption and emission efficiency is obtained.

56. (new) A light collector fabricated by the method as claimed in claim 46.